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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,204	04/21/2004	Richard S. Wise	FIS920030028	3203

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EXAMINER
MALDONADO, JULIO J

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/709,204	WISE ET AL.	
	Examiner	Art Unit	
	Julio J. Maldonado	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8 and 10-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8 and 10-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 8-12 is withdrawn in view of the newly discovered reference(s) to Lee (U.S. 6,228,763 B1) in view of Pang (U.S. 6,177,329 B1) and Kim et al. (U.S. 2002/0106891 A1). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. 6,228,763 B1) in view of Pang (U.S. 6,177,329 B1) and Kim et al. (U.S. 2002/0106891 A1).

Lee (Figs.3A-3D) teaches an wiring structure including a first dielectric layer (300); a plurality of conductors (312) disposed on said first dielectric layer (300), said conductors (312) separated laterally from each other by portions of a second dielectric layer (302, 306) and by air gaps (314), each of the conductors (312) having air gaps (314) adjacent thereto separating the conductor (312) from the second dielectric layer (302, 306); and a third dielectric layer (316) overlying the conductors (312), wherein each of said conductors (312) has a cross-section wider at a top thereof than at a bottom thereof, in accordance with each of the air gaps (314) having a cross-section

wider at a bottom thereof than at a top thereof and wherein the first dielectric layer (300) further includes a contacting stud (304) in contact with said conductor (312) (column 1, lines 41 – 52, column 2, lines 18 – 21, and column 4, line 25 – column 5, line 28).

Lee fails to teach wherein said first dielectric layer and said third dielectric layer each have a dielectric constant less than that of the second dielectric layer. However, Pang (Fig.25) teaches a wiring structure for an integrated circuit including a substrate (102); a first dielectric layer (110) made of a material selected from the group that includes parylene, HSQ and fluorinated silicate glass (FSG); a second dielectric layer (112) made of either silicon oxide or low-k dielectric layers such as parylene, HSQ and fluorosilicate glass (FSG); a plurality of conductors (122) disposed on said first dielectric layer (110), said conductors separated laterally from each other by portions of said second dielectric layer (112) and by air gaps (130); and a third dielectric layer (134) overlying the conductors, wherein said third dielectric layer (134) is made of silicon oxides (Pang, column 5, line 28 – column 6, line 35, column 9, line 1 – column 10, line 1, and column 11, lines 36 – 45).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Lee and Pang to enable forming the dielectric layers in Lee according to the teachings of Pang because one of ordinary skill in the art would have been motivated to look to alternative suitable for the disclosed dielectric layers of Lee and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

The combined teachings of Lee and Pang fail to teach wherein said first dielectric and said third dielectric layer each have a dielectric constant less than that of the second dielectric layer. However, the combination of Lee and Pang teach wherein the third dielectric layer is made of silicon oxides deposited by known CVD methods (Pang, column 9, lines 34 – 50 and column 10, lines 10 – 20). Taking this into consideration, Kim et al. teach a conventional interconnect structure including low-dielectric constant interlayer dielectric layers made of a silicon oxide material, wherein said silicon oxide material is carbon doped silicon oxide made by a CVD process (Kim et al., [0006]).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Lee and Pang with Kim et al. to enable using a low-k silicon oxide in the combination of Lee and Pang according to the teachings of Kim et al. because one of ordinary skill in the art would have been motivated to look to alternative suitable for the disclosed silicon oxide of Lee and Pang and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

It would also have been obvious to one of ordinary skill in the art to enable an embodiment of the combination of Lee, Pang and Kim et al. that includes a first and third dielectric layer having a lower dielectric constant than that of the second dielectric layer to arrive at the claimed invention.

Response to Arguments

4. Applicant's arguments with respect to claims 8, 10-12 has been considered but is moot in view of the new ground(s) of rejection.

Conclusion

5. Applicants are encouraged, where appropriate, to check Patent Application Information Retrieval (PAIR) (http://portal.uspto.gov/external/portal/pair) which provides applicants direct secure access to their own patent application status information, as well as to general patent information publicly available.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax number for this group is 571-273-8300. Updates can be found at http://www.uspto.gov/web/info/2800.htm.

Julio J. Maldonado
Patent Examiner
Art Unit 2823

Julio J. Maldonado
December 29, 2005

George Fourson
Primary Examiner